Exemption No. 6577

UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
RENTON, WASHINGTON 98055-4056

In the matter of the petition of

Boeing Commercial Airplane Group

for an exemption from § 25.1435(b)(1) of the Federal Aviation Regulations

Regulatory Docket No. 28761

GRANT OF EXEMPTION

By letter of December 6, 1996, Mr. Norman I. Lee, III, Acting Manager, Certification, Certification Programs, B-111, Boeing Commercial Airplane Group, P.O. Box 3707, Seattle, WA, 98124-2207, petitioned for exemption from the static pressure test requirement of § 25.1435(b)(1) of the Federal Aviation Regulations (FAR), for the hydraulic system on the Boeing Model 757-300 airplane.

Section of the FAR affected:

> Section 25.1435(b)(1) states that a complete hydraulic system must be static tested to show that it can withstand 1.5 times the design operating pressure without a deformation of any part of the system that would prevent it from performing its intended function. Clearance between structural members and hydraulic system elements must be adequate, and there must be no permanent detrimental deformation. For the purpose of this test, the pressure relief valve may be made inoperable to permit application of the required pressure.

ANM-97-013-E

Related Section of the FAR:

Section 25.1435(a)(2) states that each element of the hydraulic system must be able to withstand, without rupture, the design operating pressure loads multiplied by a factor of 1.5, in combination with ultimate structural loads that can reasonably occur simultaneously. Design operating pressure is maximum normal operating pressure, excluding transient pressure.

The petitioner's supportive information is as follows:

In place of the static test (4500 psi), Boeing proposes to conduct a range-of-motion test at just below the system relief pressure of 3400 psig as well as component testing at 1.5 times operating pressure (4500 psi) per § 25.1435(a)(2) for the newly added tail skid hydraulic system on the Model 757-300.

Boeing states that the remainder of the 757-300 hydraulic system complies with § 25.1435(b)(1) by similarity to the test conducted on the 757-200 and that the specific compliance approach for the remainder of the 757-300 will be defined in the 757-300 hydraulic power system certification plan.

Boeing asserts that the granting of this exemption with respect to testing a complete hydraulic system at 1.5 times operating pressure is in the public interest because the proposed method of demonstrating compliance will enhance the current level of safety by identification of additional dynamic interference problems.

Boeing provides the following factors to substantiate their position.

<u>Present Test Method vs Proposed Test Method</u>

Boeing states that the required test at 1.5 times the design operating pressure (4500 psig) would be a static test. The proposed test at just under the relief pressure (3400 psig) enables the tail skid components to be operated through their full range of motion. The effects of hose and tubing sweeps associated with tail skid movement would be observed as part of the proposed test. A study of tube deflections under pressure revealed that testing at just under the relief pressure (3400 psig) will produce essentially the same deflection as testing at 1.5 times the design operating pressure.

Notice of Proposed Rulemaking (NPRM) 96-6, issued July 3, 1996

Boeing notes that the proposed means of addressing § 25.1435(b)(1) requirements is in full compliance with the proposed requirements of NPRM 96-6, issued July 3, 1996, which states:

"The complete hydraulic system(s) must be functionally tested on the airplane in normal operation over the full range of motion of all associated user systems. The test must be conducted at the system relief pressure or 1.25 times the DOP if a system pressure relief device is not part of the system design. Clearances between hydraulic system elements and other systems or structural elements must remain adequate and there must be no detrimental effects."

Previously Granted Exemptions

The proposed exemption has been approved in many similar instances (Exemption No. 6086 for 737-300; Exemption No. 5758 for 777-200; and Exemption No. 6504 for 777-300) and has been endorsed by the FAA in NPRM 96-6 of July 3, 1996.

In view of the substantiating factors detailed above, Boeing asserts that its proposed method of pressure testing of the new tail skid hydraulic system of the 757-300 airplane provides, in the public interest, greater assurance of safe operation and hereby petitions the FAA to grant the subject exemption.

A summary of the petition was published in the Federal Register on January 13, 1997 (62 FR 1798). No comments were received.

The Federal Aviation Administration's analysis/summary is as follows:

The FAA has carefully considered the information provided by the petitioner, and has determined that there is sufficient merit to warrant a grant of exemption.

Present Test Method vs Proposed Test Method

The FAA concurs that the proposed dynamic test of the tail skid system in combination with the static proof pressure testing on all associated components at 4500 psig during component qualification testing is better than the required static test.

NPRM 96-6

The FAA concurs that the requirements of the current § 25.1435(b)(1) are met by the proposed § 25.1435(c)(3) of the NPRM 96-6 and that the petitioner's proposed means of compliance are acceptable.

Previously Granted Exemptions

The FAA concurs that the cited exemptions or partial exemptions were granted by the FAA and were the basis of proposal 12 of the NPRM 96-6.

In consideration of the foregoing, I find that a grant of exemption is in the public interest. Therefore, pursuant to the authority contained in §§ 313(a) and 601(c) of the Federal Aviation Act of 1958, delegated to me by the Administrator (14 CFR 11.53), the Boeing Commercial Airplane Group is hereby granted an exemption from § 25.1435(b)(1) of the FAR to the extent necessary to permit type certification of the Model 757-300 by conducting testing of the tail skid hydraulic system at just below 3400 psig (the system relief pressure). All test results pertinent to this exemption must be documented in a report and a copy provided to this office.

Issued in Renton, Washington, on February 25, 1997

/s/
Darrell M. Pederson
Acting Manager
Transport Airplane Directorate,
Aircraft Certification Service, ANM-100